ROADS AND MARITIME SERVICES

TRAFFIC SYSTEMS

SPECIFICATION NO. TSI-SP-040

EMERGENCY TELEPHONE

Issue: 1.0
Dated: 5/10/2018
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## RECORD OF AMENDMENTS

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1 SCOPE

This specification covers the hardware requirements for Emergency Telephones that are used in motorway applications within the State of New South Wales.

The Emergency Telephone provides access to Motorway Emergency Services when required by a motorist and is intended to be used in emergencies only.

This specification includes requirements for the design, performance and quality assurance of Emergency Telephones.

This specification may be referenced by other Roads and Maritime Services (RMS) specifications or work documents, and shall always be read in conjunction with these referencing documents (known as Referencing Specifications).

The criteria that must be satisfied for the use of wireless communication and for the use of solar power are outside the scope of this document.

The nature of the telephone service provided on the telephone hardware, in terms of connectivity, operator response and protocol, and similar is out of scope.

2 REFERENCES AND APPLICABLE DOCUMENTS

2.1 Australian and International Standards

[1] AS/NZS 1768 – Lightning Protection
[7] AS/CA 002 – Analogue interworking and non-interference requirements for Customer Equipment for connection to the Public Switched Telephone Network

2.2 RMS Documents


2.3 Other Documents

2.4 Precedence of Specifications

In the event of any conflict between the referenced specifications, the order of precedence shall be as follows:

(a) The dedicated project specification (including drawings);
(b) Other Referencing Specifications;
(c) This Specification (as amended);
(d) Other RMS specifications and documents;
(e) Australian Standard Specifications;
(f) IEC and ISO Specifications.

3 DEFINITIONS AND GLOSSARY OF TERMS

For the purposes of this Specification, the following definitions and abbreviations shall apply:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>ACMA</td>
<td>Australian Communications and Media Authority</td>
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<tr>
<td>Authorised User</td>
<td>A person authorised by RMS or its delegate to have elevated access to the</td>
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<td></td>
<td>Emergency Telephone functions, e.g. technical personnel.</td>
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<tr>
<td>Central equipment</td>
<td>Equipment in e.g. a CMC to which calls connect and are distributed to the</td>
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<td></td>
<td>Operators.</td>
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<tr>
<td>CMC</td>
<td>Corridor Management Centre</td>
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<td>ITS</td>
<td>Intelligent Transportation Systems</td>
</tr>
<tr>
<td>RCM</td>
<td>Regulatory Compliance Mark. ACMA requirement replacing former A-Tick and</td>
</tr>
<tr>
<td></td>
<td>C-Tick marks.</td>
</tr>
<tr>
<td>Referencing</td>
<td>A specification which references this specification</td>
</tr>
<tr>
<td>Specification</td>
<td></td>
</tr>
<tr>
<td>RMS</td>
<td>Roads and Maritime Services, a New South Wales government agency</td>
</tr>
<tr>
<td>SCATS</td>
<td>Sydney Co-ordinated Adaptive Traffic System</td>
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<tr>
<td>TSI</td>
<td>Traffic Systems Integration</td>
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<tr>
<td>user</td>
<td>A motorist or member of the public who uses the emergency telephone</td>
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Table 1 – Definitions and Glossary of Terms

4 GENERAL

4.1 Overview

The Emergency Telephone is the roadside device that a motorist may use to summon assistance when on the motorway.

The Emergency Telephone may be of one of two distinct types:

(a) Handset types; or
(b) Non-handset types.
An Emergency Telephone shall consist of a robust weatherproof housing containing the telephone unit and all associated equipment.

4.2 Handset Type Emergency Telephone

The handset type Emergency Telephone shall be a weatherproof device consisting of a telephone handset, the handset cord, the annunciating device, the cradle switch, and other associated circuitry in a housing suitable for roadside use. All operational facilities shall be accessible on the front face of the Emergency Telephone.

The handset cord shall be within 400-600mm in length and fully protected in a robust flexible conduit to minimise the likelihood of damage by e.g. pulling or crushing. When the user replaces the handset on its cradle, the handset cord shall not protrude outside the perimeter of the housing.

4.3 Non-handset Type Emergency Telephone

The non-handset type Emergency Telephone shall be a weatherproof device suitable for roadside use. The housing shall house all components of the roadside telephone set, including the annunciating device, and other circuitry. All operational facilities shall be accessible on the front face of the Emergency Telephone.

5 REQUIREMENTS

5.1 Call Connection and Disconnection

5.1.1 Call directions supported

The Emergency Telephone shall support both outgoing and incoming calls.

5.1.2 Call initiation and connection

The Emergency Telephone shall be able to be configured to dial a pre-programmed number upon the user pressing a prominent single button which shall be labelled ‘ASSISTANCE’ or similar.

This does not preclude the provision of an alphanumeric keypad for dialling and other purposes.

Alternatively, a handset type Emergency Telephone shall be able to be configured to dial a pre-programmed number when a user lifts the handset off its cradle. In such a case, providing a dial tone is present, the Emergency Telephone shall commence dialling within 2 seconds of the handset going off-hook.

For a handset type Emergency Telephone, during the period prior to dialling commencing, a dial tone shall be presented to the user.

If the handset has not been replaced on its cradle and the call has timed out, a call may be initiated by the user through replacing the handset on its cradle and then lifting the handset from the cradle again.

In all cases, between the completion of dialling and the call being answered, a ring tone shall be presented to the user.
5.1.3 Call disconnection

For a handset type Emergency Telephone, the call shall be disconnected when the handset is returned to the handset cradle. If the handset has not been returned to the handset cradle, an internal timer shall hang up the call 10 seconds after the CMC Operator hangs up.

For a non-handset type Emergency Telephone, the call shall be disconnected after the CMC Operator hangs up.

5.2 Call indication facilities

The Emergency Telephone shall have facilities to alert nearby persons to an incoming call via ring tones or similar to allow the call to be answered.

The ring cadence shall be as specified in AS/CA S002 for a normal telephone call over the Public switched telephone network.

5.3 Acoustic characteristics

The Emergency Telephone shall be designed to be usable in the noise levels expected in a motorway environment. It shall be designed to filter out traffic and other unwanted noise and shall have internal adjustment to ‘fine tune’ the phone to its surrounding environment.

Where voice activation is used, it shall be designed such that there is no apparent lag in the voice activation system when the user starts speaking. Any delay may result in the CMC Operator missing the beginning of a users’ conversation.

The acoustic characteristics of the Emergency Telephone shall comply with the provisions of AS/CA S004.

5.4 Fault detection and reporting

Where the communications between the Emergency Telephone and the network is IP-based, where practical, the Emergency Telephone shall support reporting of fault conditions to compatible network equipment.

5.5 Other facilities

5.5.1 Hearing aid loop facilities

The Emergency Telephone shall incorporate hearing aid loop facilities for persons with hearing disabilities.

These facilities shall comply with AS 60118.4.

5.5.2 Pre-recorded Message

Where a pre-recorded message is programmed into an Emergency Telephone the default message shall be as follows or similar:

“This is a motorway help phone provided by Roads and Maritime Services for your assistance. Pressing the ASSISTANCE [or similar] button will automatically connect you to an operator in the Motorway Control Centre. Please be prepared to inform the operator of the nature of your problem, the distance your car is from this help phone, your car type and the registration number.”

It shall be possible for different pre-recorded messages to be stored. The storage capacity shall allow for the pre-recorded messages to be of at least 60 seconds in duration.
The pre-recorded messages shall be configurable and the active message selectable by an Authorised User.

### 5.5.3 Maintenance Facilities

Secure access shall be provided for an Authorised User to access certain functions for monitoring, configuration and diagnostic purposes. These shall include but not be limited to:

(a) Reading the value of and configuring all configurable parameters including the pre-recorded messages;

(b) Displaying the wireless signal strength in dBm (for wireless connected devices).

### 5.5.4 Information facilities

Where an Emergency Telephone provides for both calling for help and for soliciting information, it shall provide two separate buttons for these different functions.

The button used for making calls shall be labelled ‘ASSISTANCE’ or similar.

The button used for soliciting information shall be labelled ‘INFORMATION’ or similar and shall be programmed with a pre-recorded message as described in Clause 5.5.2.

### 5.6 Safety

The Emergency Telephone shall comply with the requirements of the NSW Work Health and Safety Act.

### 5.7 Generic Compliance

All equipment and materials, where not otherwise specified, shall be in accordance with Australian Standards and RMS Specifications where such exist, and in their absence, with appropriate IEC and ISO Standards/Specifications.

### 5.8 Certification

The equipment shall have all necessary certifications in accordance with industry and statutory requirements.

In particular, the following Australian statutory certifications shall be provided with the equipment:

(a) Certificate of Suitability
   A Certificate of Suitability issued by the NSW Department of Fair Trading;

(b) ACMA Approval
   The equipment shall be tested by a registered testing authority for compliance with the relevant requirements for connection to the Telecommunications network. Documentary evidence that the equipment complies with all relevant ACMA requirements is required;

(c) RCM Approval
   The equipment shall comply with the ACMA RCM requirements and be certified as such.
5.9 Labelling

The equipment shall be clearly marked in a permanent and durable manner with the following information:

- (a) Manufacturer’s identification;
- (b) Equipment code or type number;
- (c) Serial number to provide traceability under the Manufacturer’s quality management system and also to verify eligibility of claims under warranty;
- (d) The approval number on the Certificate of Suitability;
- (e) ACMA RCM approval;
- (f) Approval marks of standards to which the equipment complies;
- (g) Power supply information;

The RMS acceptance or type approval number for the Emergency Telephone shall not be marked on the equipment.

Note: The reason for this prohibition is because the capability for firmware upgrades to be performed and the likelihood that equipment in the field will not have its markings appropriately amended renders an approval or acceptance marking on the equipment to be potentially misleading.

5.10 Reliability

The Emergency Telephone shall be designed to provide reliable service throughout its life, with a mean time between failures (MTBF) not less than 40,000 hours.

5.11 Power sources

5.11.1 Mains power

If the Emergency Telephone is intended to operate from mains power then it shall operate correctly and reliably for mains supply voltages over the range 205 - 253 V r.m.s. in accordance with AS 60038 and for any variations of frequency in the range 48 - 52 Hz.

The equipment shall not be damaged by mains supply voltages in the range 0 - 280 V r.m.s. and for any variations of frequency in the range 45 - 55 Hz.

The equipment shall comply with AS/NZS 3000 where relevant.

5.11.2 Solar power

If the Emergency Telephone is intended to operate from a solar power supply then the supplied manuals shall specify the solar panel and associated backup battery output requirements.

The Emergency Telephone shall have provision for connection of a backup power supply. The connection shall be weatherproof.

5.12 Environmental

The Emergency Telephone shall be designed to operate in the roadside environments present in the State of New South Wales.

- (a) Ambient air temperatures within the range –15°C to 50°C.
(b) Insolation of up to 1000 W/m², incident at an angle of 30° from the vertical, applied to the maximum exposed surface of the equipment.

(c) Relative humidity up to 90% within the temperature range 5°C to 50°C.

5.12.1 Surge Protection

The requirements for surge protection shall be as follows:

(a) Surges on Mains Supply Voltage
The equipment shall be designed to withstand transient disturbances and surges induced onto the mains supply, such as by lightning. The equipment shall provide surge protection to withstand the surges specified in AS 1768, Category B, with medium exposure peak amplitudes;

(b) Transient Voltages on Mains Supply Voltage
The equipment shall include effective protection against transients and surges present on the 230 V ac mains due to load switching, operation of power equipment, and lightning discharges. For the purpose of this Specification the equipment shall operate within specification when subjected to random voltage pulses superimposed upon the nominal 230 V a.c. mains supply. The equipment shall be type tested with pulses of the following form:

- **Rise time:** 0.25 µs
- **Duration:** 50 µs - 200 µs
- **Amplitude:** 0-800 V
- **Phase:** Variable within 20°-160° and 200°-340°
- **Pulse repetition rate:** Up to 1 every 2 s
- **Source impedance of pulse generator:** 5 ohms maximum

The pulse can occur with any polarity, i.e. with …

(i) positive polarity on the positive half-cycle; or

(ii) positive polarity on the negative half-cycle; or

(iii) negative polarity on the positive half-cycle; or

(iv) negative polarity on the negative half-cycle.

5.12.2 Environmental tests

The equipment shall pass the following environmental tests. The environmental tests shall be performed by a NATA registered laboratory or approved test organisation. If the test facilities are not NATA registered for the types of test to be performed, the Supplier shall furnish a full description of the test facilities and technical expertise of the testing organisation(s) the Supplier intends to use, for approval of RMS before commencement of these tests:

(a) Temperature and Humidity
The equipment shall be operated for 72 hours at an ambient temperature of 50°C and relative humidity of 85% minimum. The equipment operation shall be continuously monitored throughout the test to confirm correct operation of the equipment;

(b) Enclosure Protection Test
The complete equipment shall be tested for compliance with Clause 5.13. There
is no requirement for the equipment to be operational during the test, but the equipment shall operate correctly after the test.

(c) Immunity to Transient Voltages on Mains Supply Voltage
The equipment shall be tested in accordance with the test conditions described in Clause 5.12.1(b). The equipment operation shall be continuously monitored throughout the tests to confirm correct operation of the equipment;

(d) Bump Test
The equipment, in unpacked condition, shall be subjected to a bump test in accordance with AS 60068.2.29. The severity shall be 1,000 bumps at an acceleration of 98 m/s² (10g) with a pulse duration of 16 ms;

(e) Vibration
The equipment shall be subjected to the vibration tests described in this clause. The test procedures shall be in accordance with AS 60068.2.6 for sinusoidal vibration. For all tests specified in this clause, the amplitude shall be 0.75 mm up to the cross-over frequency, (approximately 8.2 Hz), where the acceleration is 0.2g, and for higher frequencies the acceleration shall be maintained constant at 0.2g.

The operation of the equipment shall be recorded during the tests and its overall performance summarised in the test report.

The tests shall be performed for three (3) mutually perpendicular axes with the equipment in the normal orientation.

For each axis of the tests, the equipment shall be tested with an endurance of 20 sweep cycles over the frequency range 5-55 Hz with an initial amplitude of 0.75 mm. The sweep rate shall be 1 octave per minute.

5.12.3 Use of Fire-Resistant Materials

Materials and components used in the equipment shall be selected so as to minimise the risk of fire. In this respect the requirements for resistance to heat and fire in AS/NZS 3100 shall apply.

The exterior parts of housings shall use materials which are inherently fire-resistant.

Fire resistant materials shall be non-toxic and halogen free.

Printed circuit boards and assemblies shall be capable of passing the flammability test UL 94V-1 in UL 94.

5.13 Enclosure

The enclosure including all external features and handset (where applicable) shall provide enclosure protection level IP45, in accordance with AS 60529.

The design shall ensure that environmental dust, other airborne contaminants, moisture and humidity levels such as may occur inside the enclosure do not adversely affect the functional aspects of the Emergency Telephone.

The Emergency Telephone shall be designed with adequate ventilation by natural convection to allow free air flow for cooling and to prevent condensation inside the housing under all weather conditions.

Electric fans, blowers, and similar devices shall not be used to provide the air flow for cooling of parts and ventilation.
All printed circuit cards shall be protected from the environment by a conformal coating or a spray on lacquer designed for this purpose. The coating used shall be a solder-through type.

### 5.14 Manuals

The Supplier shall provide the following manuals:

- (a) Operations Manual;
- (b) Maintenance Manual;
- (c) Installation and Commissioning drawings and manual.

The manuals shall be at an appropriate level of detail and shall comply with TSI-SP-062.

The Supplier shall provide these manuals as part of the compliance approval of the devices as part of the TS201 process.

### 5.15 Accessories

Accessories required for the installation and operation of each Emergency Telephone shall be supplied.

### 5.16 Packaging

The equipment and any spare parts, tools and ancillary equipment shall be packed to protect them from damage during transport and handling. All fittings liable to damage during shipment shall be removed and packed separately.

Equipment must not be damaged and preset adjustments must not be affected when subjected to the shock and vibration of transport between the Supplier’s premises and the nominated delivery point. Unless otherwise directed, the Supplier shall select the means of transport and pack the equipment to ensure compliance with this clause.

### 6 QUALITY ASSURANCE AND CONTROL

#### 6.1 Quality System

The manufacturer shall operate a quality management system complying with AS/NZS ISO 9001 or ISO 9001 and certified by an accredited quality management system certification body.

#### 6.2 Quality Plan

The manufacturer shall document a quality plan appropriate to the item detailing the quality control tests and assessments the manufacturer will conduct during manufacture prior to release. This shall include sampling plans and test frequency, and a description of the records to be made, as relevant. A copy of this quality plan shall be provided to RMS as part of the approval/acceptance process. Acceptance of this quality plan by RMS is a prerequisite to gaining overall approval/acceptance.
6.3 Quality Audits

RMS reserves the right to examine the Manufacturer's quality records pertaining to an order. RMS also reserves the right to arrange for an independent quality audit concerning items in contract.

7 APPROVAL/ACCEPTANCE

7.1 Approval/Acceptance Process

To gain approval/acceptance of the Emergency Telephone the supplier shall follow the process defined in TS201.

7.2 Revocation of Approval/Acceptance

There are several circumstances in which the Supplier may be requested to show cause why Approval/Acceptance should not be revoked. These may include but not be limited to:

(a) an adverse service history of the equipment in regard to performance; or
(b) modification to the equipment or the intended method of use which make it different from that for which Approval/Acceptance was issued; or
(c) loss of third-party quality management system certification; or
(d) repeated failure to supply equipment in compliance with specified requirements; or
(e) serious breaches in quality procedures as established in quality audits conducted by or on behalf of RMS; or
(f) fraudulent claims or misrepresentations regarding the equipment operation by the Supplier, the manufacturer or their agent; or
(g) failure to provide software and firmware maintenance or upgrades to correct deficiencies to the operation of the equipment or to make the equipment fully compatible with RMS’s network.

7.3 Fraudulent Claims

If fraudulent claims or misrepresentations are discovered after Approval/Acceptance has been granted, then the Approval/Acceptance may be revoked.

8 WARRANTY AND SPARES

8.1 Warranty

Purchase of any equipment under this Specification shall be subject to a warranty period of 24 months after installation or 36 months after dispatch from the manufacturer’s works or agent’s premises to the RMS store, whichever comes first.
Any equipment failed in service or found to be defective within the warranty period, will be delivered to the Supplier, who shall then make good the defect or arrange to have the defect made good, and subsequently return the good unit to RMS at no charge to RMS. Unless otherwise agreed, defective goods shall be processed and returned within 30 calendar days from the date the defective item is delivered to the Supplier.

It is expressly understood that any equipment damaged as a result of a traffic accident, abuse or act of vandalism after delivery to RMS will not be covered by warranty provisions.

8.2 Spares

The Supplier shall maintain a reasonable supply of spare parts and modules to allow the Emergency Telephone to be maintained in service for a minimum period of ten (10) years.

The Supplier shall give notice to RMS prior to the last manufacturing run before cessation of manufacture for the particular spares type. The Supplier shall maintain spares for a minimum period of five (5) years after cessation of manufacture for the particular spares type.